HEAT EXCHANGER (HX)

MARK	HX-1, HX-2
SERVICE	LINEAR ACCELERATOR
TYPE	PLATE AND FRAME
PROCESS CHILLED WATER SIDE	
MEDIA	100% WATER
FLOW (GPM)	17
ENTERING WATER TEMPERATURE (°F)	45
LEAVING WATER TEMPERATURE (°F)	55
WATER PRESSURE DROP (FEET)	6.5
LINEAR ACCELERATOR WATER SIDE	
MEDIA	100% WATER
FLOW (GPM)	4.0
ENTERING WATER TEMPERATURE (°F)	108
LEAVING WATER TEMPERATURE (°F)	65.0
WATER PRESSURE DROP (FEET)	1.0
CAPACITY (BTU/HR)	85,510
NOMINAL SIZE (INCHES)	12"Lx8"Wx19.3"T
OPERATING WEIGHT (LBS)	150
BASIS OF SPECIFICATION	
MANUFACTURER	–
MODEL	–
NOTES	1–5

NOTES:
1. MOUNT ON 4–INCH THICK CONCRETE PAD.
2. HEAT EXCHANGER SHALL BE CONSTRUCTED TO ALLOW A FUTURE 25% INCREASE IN CAPACITY.
3. 1–INCH INLET/OUTLET PIPE CONNECTIONS.
4. MATERIALS:
   –FRAME: STEEL
   –PLATES: 316L STAINLESS STEEL
5. HEAT EXCHANGER SHALL BE FULLY INSULATED WITH THERMAL INSULATING WOOL "TYPE I". INSULATION SHALL BE CONSTRUCTED OF NON–COMBUSTIBLE, FLEXIBLE WOOL. INSULATION SHALL BE 2" THICK. INSULATION SHALL BE ATTACHED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ALL INSULATION SHALL BE JACKETED WITH 6 OZ. CANVAS WITH FIRE RETARDANT LAGGING.

PUMPS (P)

MARK	P–1, P–2, P–3, P–4
SERVICE	EQMT WATER
TYPE	INLINE
FLUID	100% WATER
PERFORMANCE	
TEMPERATURE (°F)	65
FLOW (GPM)	4.0
TOTAL HEAD (FEET)	55
MOTOR	
SPEED (RPM)	1750
SIZE (HP)	0.5
VOLT–PHASE–HERTZ	460–3–60
VARIABLE FREQUENCY DRIVE	NO
EFFICIENCY (%)	73.0
BASIS OF SPECIFICATION	
MANUFACTURER	–
MODEL	–
NOTES	1,2

NOTES:
1. INSTALL WITH MANUFACTURER'S REQUIRED NET POSITIVE SUCTION HEAD (NPSH).
2. MOUNT PUMP FROM FLOOR ON ANGLE IRON FRAME WITH NEOPRENE ISOLATION.

MECHANICAL SYMBOLS:

ABBREVIATIONS:

AC	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
CF	CENTRIFUGAL FAN
CD	COOLING COIL CONDENSATE
CO	CLEAN OUT
CFM	CUBIC FEET PER MINUTE
CUH	CABINET UNIT HEATER
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CW	COLD WATER
Db	DRY BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROL
dB	DECIBELS
Dp	DEW POINT TEMPERATURE
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EF	EXHAUST FAN
EX.	EXISTING
FC	FORWARD CURVED FAN
FLR.	FLOOR
FD	FIRE DAMPER
FSD	COMBINATION FIRE/SMOKE DAMPER
GH	HOT GLYCOL WATER HEATING SUPPLY
GHR	HOT GLYCOL WATER HEATING RETURN
GPM	GALLONS PER MINUTE
GR	GLYCOL WATER RUN–AROUND SUPPLY
GRR	GLYCOL WATER RUN–AROUND RETURN
GV	GRAVITY VENTILATOR
HC	HEATING COIL
HP	HORSEPOWER
HZ	ZONE HUMIDIFIER
MAX.	MAXIMUM
MIN.	MINIMUM
N.T.S.	NOT TO SCALE
NOM.	NOMINAL
OA	OUTDOOR AIR
PD	PRESSURE DROP
PF	PRE–FILTER
PH	PREHEAT
RA	RETURN AIR
REA	RELIEF AIR
RF	RETURN FAN
RH	REHEAT COIL
Rh	RELATIVE HUMIDITY
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
Sp. Gr.	SPECIFIC GRAVITY
SP	STATIC PRESSURE
SPS	STATIC PRESSURE SENSOR
SS	STAINLESS STEEL
TCP	TEMPERATURE CONTROL PANEL
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
Wb	WET BULB TEMPERATURE
X	EXISTING
XR	EXISTING TO BE REMOVED
XRL	EXISTING TO BE RELOCATED

GENERAL SYMBOLS:

- POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
- LIMIT OF DEMOLITION
- EXISTING TO REMAIN — X
- EXISTING TO BE REMOVED — XR
- EXISTING TO BE RELOCATED — XRL

CALL OUTS:

- (#) REFERENCE TO CODED NOTE

CONTROL SYMBOLS:

- (T) PNEUMATIC THERMOSTAT
- [T] DDC THERMOSTAT
- [H] HUMIDITY SENSOR
- [S] SENSOR

HVAC PIPING:

- 9'–2" HEIGHT OF BOTTOM OF PIPE ABOVE FLOOR
- —CD— CONDENSATE PIPING
- —F— FIRE SUPPRESSION PIPE
- —CHWS— CHILLED WATER SUPPLY
- —CHWR— CHILLED WATER RETURN
- —PCWS— PROCESS CHILLED WATER SUPPLY
- —PCWR— PROCESS CHILLED WATER RETURN
- —D— DRAIN
- —V— VENT LINE
- SHUTOFF VALVE
- SHUTOFF VALVE IN VERTICAL PIPE
- CHECK VALVE
- UNION
- REDUCER OR INCREASER
- PIPE TRANSITION
- ECCENTRIC REDUCER
- TOP CONNECTION, 45° OR 90°
- BOTTOM CONNECTION, 45° OR 90°
- SIDE CONNECTION
- DIRECTION OF FLOW
- TRIPLE DUTY VALVE (SHUTOFF, BALANCE, CHECK)
- STRAINER
- BALANCING VALVE
- PRESSURE REDUCING VALVE
- FLEXIBLE PIPE CONNECTOR
- THERMOMETER IN PIPE WELL
- PIPE GUIDE
- PIPE EXPANSION ANCHOR
- E.L. FLEXIBLE METAL EXPANSION LOOP ASSEMBLY
- GAUGE PORT (PETE'S PLUG)
- DRAIN VALVE WITH HOSE FITTING
- 3–WAY CONTROL VALVE
- 2–WAY CONTROL VALVE
- PRESSURE GAUGE
- FD LOCAL DRAIN, VALVED WITH 3/4" THREADED CONNECTOR
- NO NORMALLY OPEN
- NC NORMALLY CLOSED
- MAV MANUAL AIR VENT

STATEMENT OF BID ITEMS:

BID ITEM 1. (BASE BID):

PROVIDE PROCESS LOOP TIE–INS: WORK INCLUDES GENERAL CONSTRUCTION, ALTERATIONS, MECHANICAL, AND ELECTRICAL WORK AS INDICATED ON DRAWINGS AND IN SPECIFICATIONS. GENERAL SCOPE OF WORK IS TO EXTEND PROCESS CHILLED WATER SERVICE TO AREAS AND EQUIPMENT LOCATED THROUGHOUT THE FACILITY.

BID ITEM 2. (DEDUCT ALTERNATE NO. 1):

1. SAME AS BID ITEM 1 (BASE BID) EXCEPT DELETE DEMOLITION AND NEW WORK ASSOCIATED WITH LINEAR ACCELERATOR #2 PROCESS LOOP TIE–IN.
2. DEMOLITION AND NEW WORK ASSOCIATED WITH LINEAR ACCELERATOR #1 SHALL BE COMPLETED WITH VALVED/CAPPED PROCESS CHILLED WATER PIPING FOR FUTURE CONNECTION TO LINEAR ACCELERATOR #2 SYSTEM.
3. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.

BID ITEM 3. (DEDUCT ALTERNATE NO. 2):

1. SAME AS BID ITEM 2 (DEDUCT ALTERNATE NO. 1) EXCEPT ALSO DELETE NEW PROCESS CHILLED WATER PIPING FROM SUB–BASEMENT TO FIRST FLOOR MECHANICAL ROOM 107.
2. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

GENERAL NOTES:

A. LOCATIONS AND ROUTING OF EXISTING PIPING, DUCTWORK AND EQUIPMENT IS PRESUMED FROM EXISTING DRAWINGS. MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL PRIOR TO COMMENCEMENT OF CONSTRUCTION. NOTIFY ENGINEER OF ANY CONDITIONS WHICH WILL NOT PERMIT THE WORK TO BE PERFORMED AS INDICATED ON THESE DRAWINGS.

B. PRIOR TO INSTALLATION, VERIFY PRECISE LOCATION OF NEW WALL MOUNTED DEVICES WITH VA AND ARCHITECT/ENGINEER.

C. PROVIDE ADEQUATE SERVICE CLEARANCE FOR ALL MECHANICAL EQUIPMENT. REFER TO INSTRUCTIONS FROM THE EQUIPMENT MANUFACTURER. MAINTAIN A MINIMUM OF 18 INCH CLEARANCE AT CONTROLS FOR VARIABLE AIR VOLUME TERMINALS.

D. NEW DUCTS OR PIPING SHALL NOT BE ROUTED ABOVE ELECTRICAL PANELS. REFER TO ELECTRICAL DRAWINGS FOR LOCATION OF PANELS.

E. NO TEMPERATURE SENSING CONTROL DEVICES SHALL BE LOCATED OVER HEAT PRODUCING DEVICES.

F. WHERE EQUIPMENT IS TO BE REMOVED, REMOVE ALL ASSOCIATED PIPING, DUCTWORK, CONTROLS, CONCRETE PADS, SUPPORTS, ETC. PATCH WALL AND FLOOR OPENINGS TO MATCH ADJACENT SURFACES.

G. CONTRACTOR SHALL REMOVE AND REPLACE CEILING TILES AND GRID AS REQUIRED TO COMPLETE DEMOLITION AND NEW WORK IN AREAS INDICATING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY TILES OR GRID DAMAGED DUE TO THIS WORK.

H. COORDINATE ALL SHUT–DOWNS OF EXISTING SYSTEMS WITH VA PER SPECIFICATIONS. ALL SHUT–DOWNS SHALL OCCUR DURING WEEKENDS OR BETWEEN 5:00PM AND 7:00AM ON WEEKDAYS ("OFF–HOURS"). INCLUDE ALL PREMIUM TIME CHARGES IN BID.

I. ALL NOISE GENERATING OPERATIONS, INCLUDING CUTTING OF CEILINGS, WALLS AND FLOORS, CORING, DRILLING, ETC. SHALL BE SCHEDULED DURING WEEKENDS OR BETWEEN 5:00PM AND 7:00AM ON WEEKDAYS ("OFF–HOURS"). INCLUDE ALL PREMIUM TIME CHARGES IN BID.

J. CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LIGHTING TO ADEQUATELY LIGHT ALL CONSTRUCTION AREAS, TEMPORARILY PARTITIONED AREAS, AND EXIT CORRIDORS MAINTAINED DURING CONSTRUCTION.

PROJECT COORDINATION NOTES:

A. THIS PROJECT CONSISTS OF MULTIPLE TRADES OF WORK PERFORMED WITHIN AN EXISTING BUILDING, ALL OF WHICH ALLOWS VERY LITTLE PERMISSIBLE RANGE OF VARIATION. THE CONTRACTOR SHALL TAKE CAREFUL CONSIDERATION WITH THE COORDINATION AND INSTALLATION OF THE MULTITUDE OF NEW SYSTEMS WHILE ALSO ACCOMMODATING ANY EXISTING SYSTEMS TO REMAIN.

B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL TRADES ASSOCIATED WITH THIS PROJECT AND ISSUING COORDINATION PLANS PRIOR TO COMMENCEMENT OF EACH PHASE OF CONSTRUCTION.

C. THE COORDINATION DRAWINGS SHALL ILLUSTRATE ALL SYSTEMS IN PLACE. NO EXCEPTIONS! THE CONTRACTOR SHALL SHOW ALL NECESSARY OFFSETS, TRANSITIONS, ETC. AS REQUIRED IN ORDER TO ACCOMMODATE CONDITIONS IDENTIFIED IN THE FIELD.

D. IF CONFLICTS ARE IDENTIFIED DURING THE DEVELOPMENT OF COORDINATION PLANS, THE CONTRACTOR SHALL NOTIFY THE VA COR, ARCHITECT, AND/OR ENGINEER OF ANY CONDITIONS WHICH WILL NOT PERMIT THE WORK TO BE PERFORMED AS INDICATED ON THE PROJECT PLANS.

E. A COMPLETED SET OF COORDINATION PLANS ISSUED FOR REVIEW SHALL CONFIRM THAT THE CONTRACTOR FULLY UNDERSTANDS THE PROJECT CONSTRAINTS AND ALL KNOWN CONFLICTS HAVE BEEN ADDRESSED.

PROCESS EQUIPMENT SHUTDOWN NOTES:

A. PROCESS LOOP EQUIPMENT CONNECTIONS SHALL BE LIMITED TO ONE EQUIPMENT GROUP AT A TIME. THE CONTRACTOR SHALL COMPLETE THE SHUTDOWN, CONNECTION, AND START–UP OF ONE EQUIPMENT GROUP BEFORE STARTING THE NEXT.

B. CONTRACTOR SHALL SUBMIT AN OVERALL SHUTDOWN SCHEDULE TO THE COR FOR APPROVAL. SPECIFIC EQUIPMENT SHUTDOWN REQUEST MUST BE SUBMITTED TO THE VA COR 14 DAYS PRIOR TO THE SHUTDOWN. THE REQUEST SHALL INCLUDE: SHUTDOWN DATE AND TIME, EQUIPMENT AND ROOMS AFFECTED, DATE AND TIME EQUIPMENT WILL BE BACK IN SERVICE, TEMPORARY COOLING EQUIPMENT REQUIRED.

C. BALANCER SHALL RECORD CHILLED WATER FLOW AND DISCHARGE AIR TEMPERATURE OF EACH PIECE OF EQUIPMENT PRIOR TO THE SCHEDULED SHUTDOWNS.

D. ALL PROCESS LOOP SHUTDOWNS AND CONNECTIONS SHALL OCCUR OVER THE WEEKEND, SATURDAY AND SUNDAY. THE SCOPE FOR A WEEKEND CONNECTION SHALL INCLUDE: NOTIFY FACILITIES AND HAVE THEM SHUT OFF THE EQUIPMENT, VALVE OFF AND DRAIN CHILLED WATER BRANCHES FEEDING THE EQUIPMENT, CUT IN THE TEES AND VALVES, FLUSH BRANCH PIPING, CLEAN STRAINER, FILL BRANCHES, OPEN VALVES TO PROCESS COOLING LOOP, ADJUST BALANCE VALVES TO OBTAIN REQUIRED FLOWS, START–UP EQUIPMENT, VERIFY OPERATION.

E. THE CONTRACTOR SHALL PROVIDE TEMPORARY COOLING EQUIPMENT FOR EACH SPACE THAT MUST REMAIN IN USE. THIS INCLUDES PROVIDING HOSES FOR WATER AND DRAIN CONNECTIONS, OR TEMPORARY DUCTWORK TO REJECT HOT AIR.

PROJECT PHASING NOTES:

A. THIS PROJECT WILL INVOLVE TWO (2) GENERAL PHASES:
- PHASE 1: NON–CRITICAL PROCESS LOADS, AND
- PHASE 2: CRITICAL PROCESS LOADS

B. PHASES SHALL OCCUR IN SEQUENTIAL ORDER. UNDER EACH PHASE, INDIVIDUAL EQUIPMENT SHUTDOWN AND PROCESS LOOP CONNECTION SCHEDULES SHALL BE ESTABLISHED WITH VA COR, USER GROUP, AND ARCHITECT/ENGINEER.

C. NOTE THAT INDIVIDUAL EQUIPMENT SHALL OCCUR UNDER THE ASSIGNED PHASE. REFERENCE PROCESS CHILLED WATER LOADS SCHEDULE, DRAWING 1–M2.

D. PHASE 2 CRITICAL PROCESS LOADS SHALL NOT BE CONNECTED UNTIL ALL PHASE 1 NON–CRITICAL PROCESS LOADS HAVE BEEN CONNECTED AND HAVE OPERATED WITHOUT INTERRUPTION OR ISSUE FOR A PERIOD OF 21 DAYS.

FOR CONSTRUCTION

FULLY SPRINKLERED

Final Construction Documents	04-03-15
Revisions:	**Date**

CONSULTANTS:

STATE OF OHIO — L.D. HENDRIX, JR — 74490 — REGISTERED PROFESSIONAL ENGINEER

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Drawing Title: **SYMBOLS, NOTES, AND SCHEDULES**

Approved: Project Director

Project Title: **PROVIDE PROCESS LOOP TIE-INS**

Location: **VAMC - WADE PARK**

Date: 04-03-15 | Checked: **LDH** | Drawn: **LDH**

Project Number: 541-15-203

Building Number: 1

Drawing Number: **1-M1**

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Office of Facilities Management

Department of Veterans Affairs

VA FORM 08–6231, OCT 1978

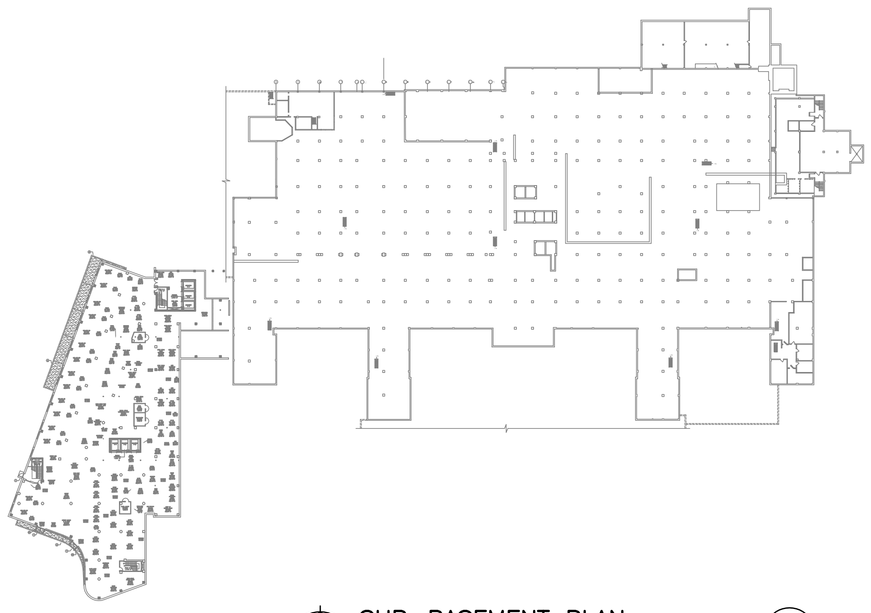
VA WADE PARK PROCESS CHILLED WATER LOADS SCHEDULE

Tag #	Tag	Status	Project	Floor	Service Area	MBH	Tons	GPM	Reference Drawing	Phase
A	ACU-1	EXISTING	LAB WAREHOUSE - PHASE 1	BASEMENT	IRM Telecomm Rm B-F515	29.1	2.4	5.8	-	1
B	ACU-2	EXISTING	LAB WAREHOUSE - PHASE 1	BASEMENT	Engineering Closet B-F516	29.1	2.4	5.8	-	1
C	ACU-3	EXISTING	LAB WAREHOUSE - PHASE 1	FIRST FLOOR	Engineering Closet 1-F516	29.1	2.4	5.8	-	1
D	ACU-4	EXISTING	LAB WAREHOUSE - PHASE 1	FIRST FLOOR	IRM Telecomm 1-F515	29.1	2.4	5.8	-	1
E	ACU-5	EXISTING	LAB WAREHOUSE - PHASE 2	BASEMENT	Elev Eqmt Rm B-F541	117.4	9.8	23.5	1-M7A	1
F	ACU-6	EXISTING	LAB WAREHOUSE - PHASE 1	BASEMENT	Elev Eqmt Rm B-F503	29.1	2.4	5.8	1-M7A	1
G	ACU-7	EXISTING	LAB WAREHOUSE - PHASE 1	BASEMENT	Exit Passage B-F501	28.2	2.4	5.6	-	1
H	ACU-8	EXISTING	LAB WAREHOUSE - PHASE 1	BASEMENT	Exit Passage B-F404	28.9	2.4	5.8	1-M7A	1
I	ACU-9	EXISTING	LAB WAREHOUSE - PHASE 2	BASEMENT	Elev Eqmt Rm B-F541	117.4	9.8	23.5	1-M7A	1
J	ACU-10	EXISTING	LAB WAREHOUSE - PHASE 1	BASEMENT	Elev Eqmt Rm B-F503	29.1	2.4	5.8	1-M7A	1
K	~~AHU-2~~	~~EXISTING~~	~~LAB WAREHOUSE - PHASE 1~~	~~BASEMENT~~	~~Transformer Rm D21~~	~~170.6~~	~~14.2~~	~~34.1~~	~~1-M7A~~	NIC
L	ACU-1	EXISTING	1993 LINACC	BASEMENT	Computer Equip Rm C21L	11.0	1.0	2.2	1-M7D	2
M	LINEAR ACCEL #2	EXISTING	2004 LINACC	BASEMENT	Linear Acc #2 C21N3	85.4	7.1	17	1-M7D	2
N	LINEAR ACCEL #1	EXISTING	2007 LINACC REPLACEMENT	BASEMENT	Linear Acc #1 C21K	85.4	7.1	17	1-M7D	2
O	ACU-1	EXISTING	RADIOLOGY - PHASE 2	BASEMENT	Equipment B-C523B	31.0	2.6	6.2	1-M7C	1
P	ACU-2	EXISTING	RADIOLOGY - PHASE 2	BASEMENT	Telecomm B-C505	31.0	2.6	6.2	1-M7C	1
Q	ACU-3	EXISTING	RADIOLOGY - PHASE 2	FIRST FLOOR	Engineering Rm 1-C521	31.0	2.6	6.2	1-M8	1
R	ACU-4	EXISTING	RADIOLOGY - PHASE 2	FIRST FLOOR	Telecomm 1-C519	31.0	2.6	6.2	1-M8	1
S	~~ACU-1~~	~~EXISTING~~	~~RADIOLOGY NORTH~~	~~BASEMENT~~	~~Angio Eqmt B-B601~~	~~67.1~~	~~5.6~~	~~13.3~~	~~1-M7C~~	NIC
T	~~ACU-2~~	~~EXISTING~~	~~RADIOLOGY NORTH~~	~~BASEMENT~~	~~Bi-Plane Angio Eqmt B-B605~~	~~67.1~~	~~5.6~~	~~13.3~~	~~1-M7C~~	NIC
U	~~ACU-3~~	~~EXISTING~~	~~RADIOLOGY NORTH~~	~~BASEMENT~~	~~Eng Closet B-B545~~	~~67.1~~	~~5.6~~	~~13.3~~	~~1-M7C~~	NIC
V	~~ACU-4~~	~~EXISTING~~	~~RADIOLOGY NORTH~~	~~BASEMENT~~	~~CT Systems B-B583~~	~~31.0~~	~~2.6~~	~~6.0~~	~~1-M7C~~	NIC
W	~~ACU-5~~	~~EXISTING~~	~~RADIOLOGY NORTH~~	~~BASEMENT~~	~~CT Eqmt B-B581~~	~~67.1~~	~~5.6~~	~~13.3~~	~~1-M7C~~	NIC
X	~~ACU-6~~	~~EXISTING~~	~~RADIOLOGY NORTH~~	~~BASEMENT~~	~~CT Eqmt B-B582~~	~~13.4~~	~~1.1~~	~~2.7~~	~~1-M7C~~	NIC
Y	ACU-1	EXISTING	CONSOLIDATION RADIOLOGY RENO	FIRST FLOOR	MRI Equip 1-B-539	33.4	2.8	6.7	1-M8	2
Z	ACU-2	EXISTING	CONSOLIDATION RADIOLOGY RENO	FIRST FLOOR	MRI Equip 1-B-539	33.4	2.8	6.7	1-M8	2
AA	ACU-3	EXISTING	CONSOLIDATION RADIOLOGY RENO	FIRST FLOOR	MRI Equip 1-B-531	22.7	1.9	4.5	1-M8	2
BB	ACU-4	EXISTING	CONSOLIDATION RADIOLOGY RENO	FIRST FLOOR	MRI Equip 1-B-531	22.7	1.9	4.5	1-M8	2
CC	PHILIPS MRI EQMT	EXISTING	CONSOLIDATION RADIOLOGY RENO	FIRST FLOOR	MRI Scan 1-B-532	188	15.6	37.5	1-M8	2
DD	TOSHIBA MRI EQMT	EXISTING	CONSOLIDATION RADIOLOGY RENO	FIRST FLOOR	MRI Scan 1-B-538	110	9.2	22	1-M8	2
EE	ACU-2	EXISTING	IN-HOUSE	BASEMENT	Electric Room C21S	18.0	1.5	3.6	1-M7D	2
FF	~~ACU-7~~	~~EXISTING~~	~~RADIOLOGY NORTH~~	~~BASEMENT~~	~~Electric Room B-B551~~	~~31.0~~	~~2.6~~	~~6.0~~	~~1-M7C~~	NIC
GG	~~ACU-8~~	~~EXISTING~~	~~RADIOLOGY NORTH~~	~~BASEMENT~~	~~Angio Eqmt B-B547~~	~~67.1~~	~~5.6~~	~~13.3~~	~~1-M7C~~	NIC

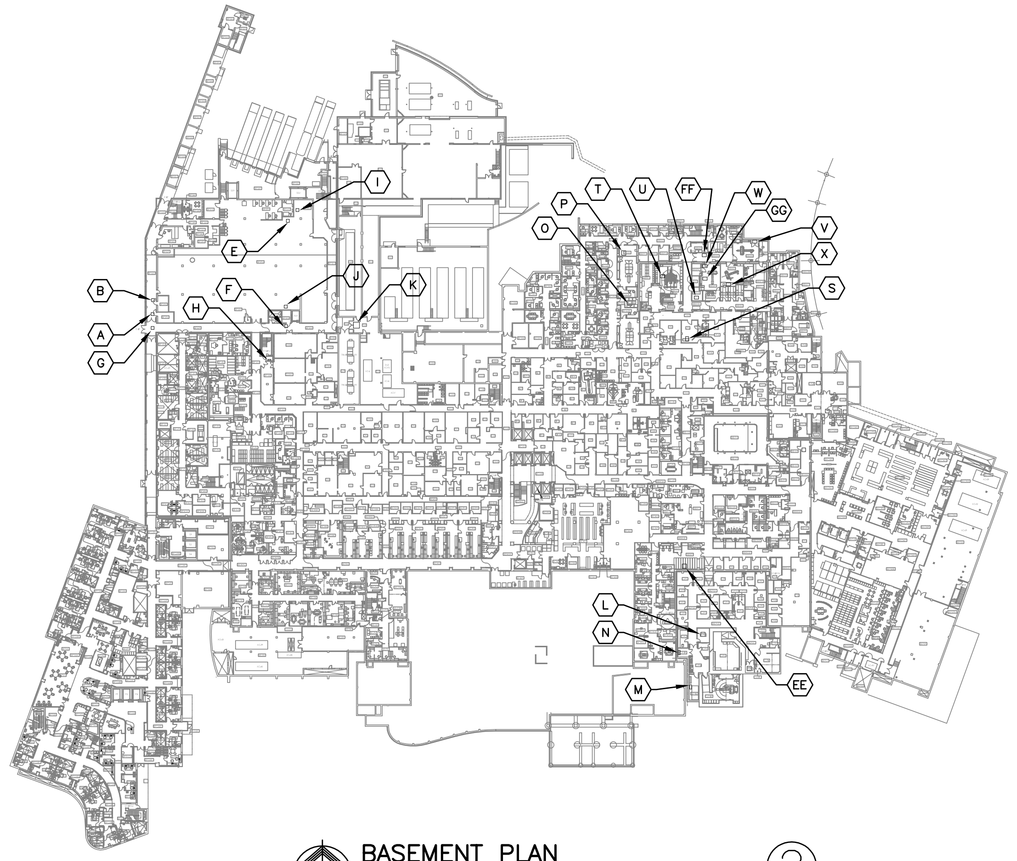
CONNECTED LOAD THIS PROJECT (GPM)	355
APPROXIMATE SPARE CAPACITY (GPM)	38.9
APPROXIMATE TOTAL PROCESS CHILLED WATER LOOP CAPACITY (GPM)	393.9

NOTES:

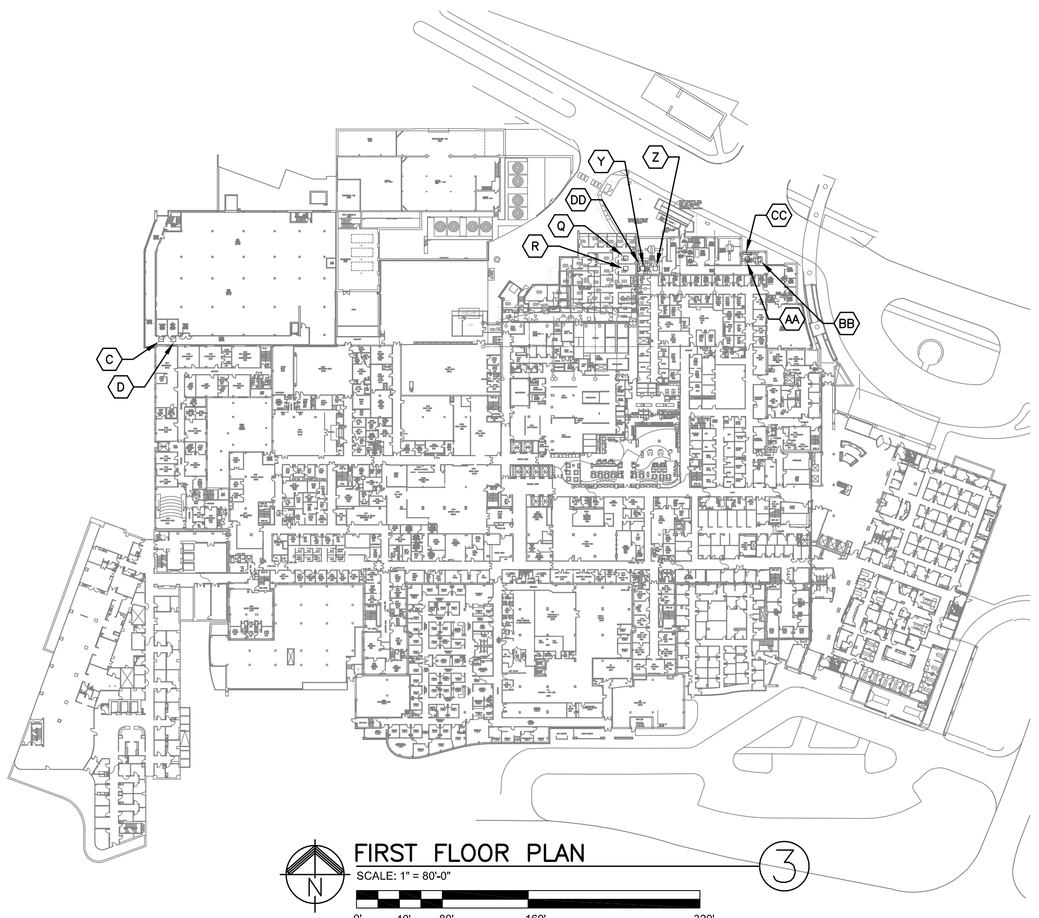
1. BALANCER MUST RECORD EXISTING CHILLED WATER FLOW THROUGH EACH OF THE ABOVE PHASE 1 AND PHASE 2 EQUIPMENT PRIOR TO DISRUPTING THE EXISTING SYSTEM. (SEE NOTE 3 BELOW REGARDING 'NIC'.) AFTER EACH BRANCH OF THE PROCESS CHILLED WATER SYSTEM IS CONNECTED, THE BALANCER MUST ADJUST THE BALANCE VALVE AT EACH PIECE OF EQUIPMENT TO OBTAIN THE EXISTING FLOW. AFTER ALL OF THE EQUIPMENT HAS BEEN CONNECTED AND RUNNING, THE BALANCER SHALL RE-BALANCE THE ENTIRE PROCESS CHILLED WATER SYSTEM.
2. EXISTING GLYCOL SYSTEMS SUCH AS BOTH MRIs, BOTH LINEAR ACCELERATORS, SHALL BE DRAINED AND FLUSHED CLEAN BEFORE CONNECTING TO THE PROCESS CHILLED WATER LOOP.
3. ITEMS LISTED AS 'NIC' ARE LISTED FOR REFERENCE ONLY. EQUIPMENT IS ALREADY CONNECTED TO THE PROCESS CHILLED WATER SYSTEM, THEREFORE ARE 'NOT IN CONTRACT'.



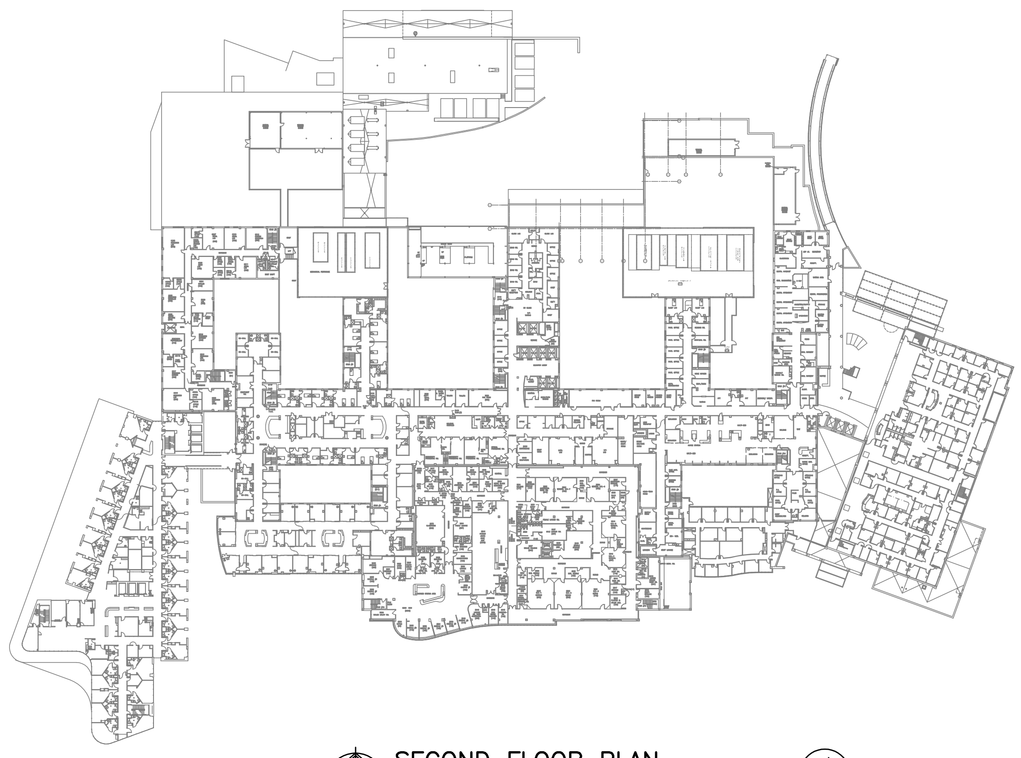
SUB–BASEMENT PLAN 1
SCALE: 1" = 80'-0"
0' 40' 80' 160' 320'



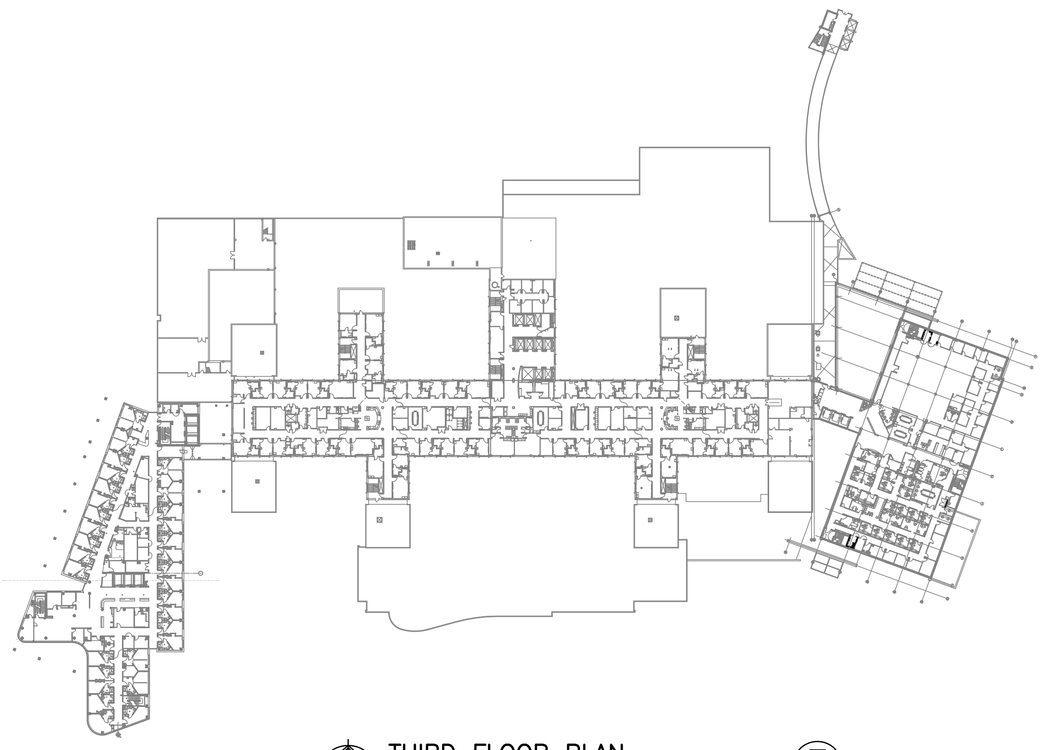
BASEMENT PLAN 2
SCALE: 1" = 80'-0"
0' 40' 80' 160' 320'



FIRST FLOOR PLAN 3
SCALE: 1" = 80'-0"
0' 40' 80' 160' 320'



SECOND FLOOR PLAN 4
SCALE: 1" = 80'-0"
0' 40' 80' 160' 320'



THIRD FLOOR PLAN 5
SCALE: 1" = 80'-0"
0' 40' 80' 160' 320'

FOR CONSTRUCTION

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Final Construction Documents	04-03-15
Revisions:	**Date**

CONSULTANTS:

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Drawing Title: **PROCESS CHILLED WATER TIE-INS KEY PLANS**

Approved: Project Director

Project Title: **PROVIDE PROCESS LOOP TIE-INS**

Location: **VAMC - WADE PARK**

Date: 04-03-15 | Checked: **LDH** | Drawn: **LDH**

Project Number: 541-15-203

Building Number: 1

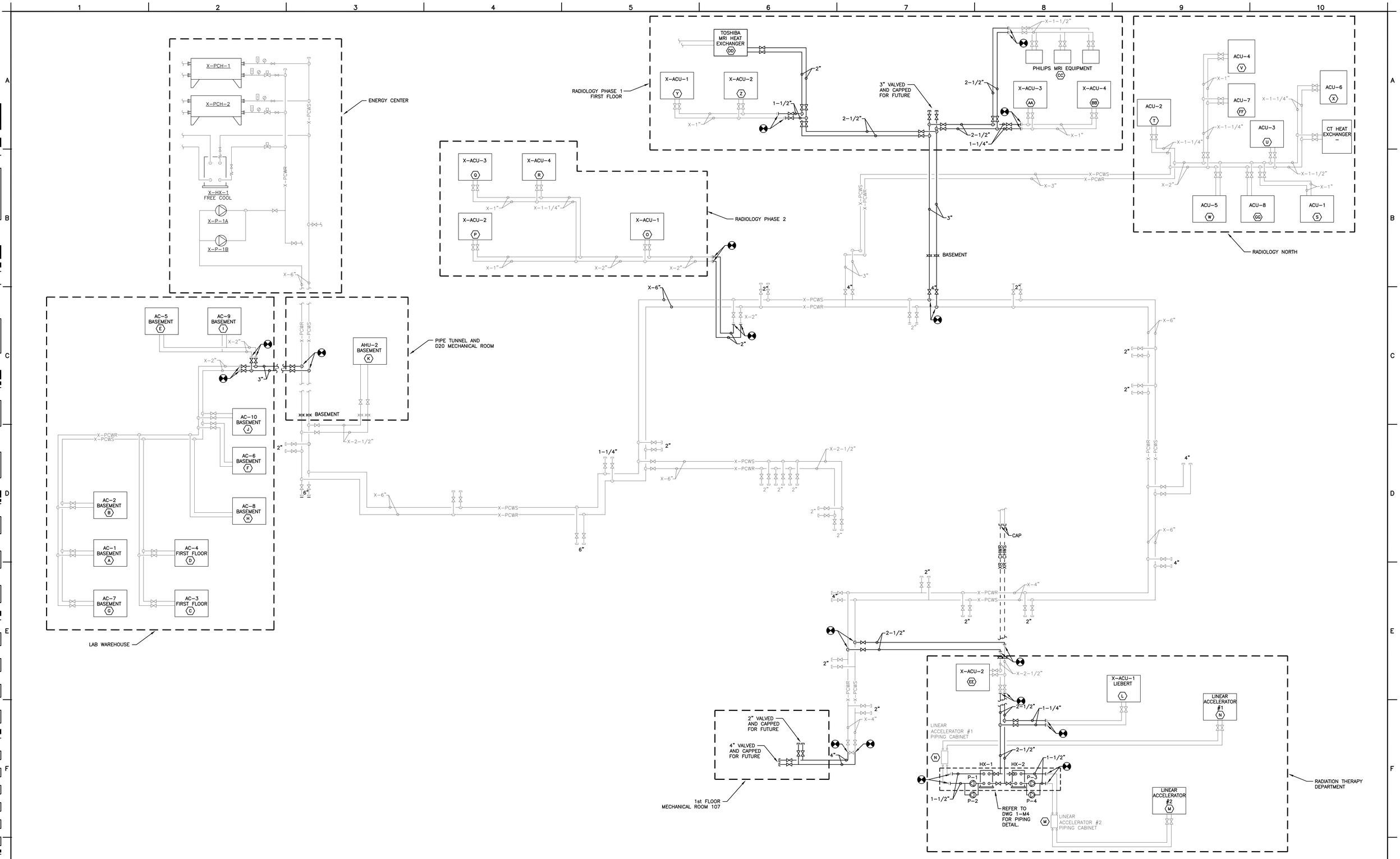
Drawing Number: **1-M2**

Dwg. of

Office of Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978



three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot

FOR CONSTRUCTION

FULLY SPRINKLERED

Final Construction Documents	04-03-15
Revisions:	**Date**

CONSULTANTS:

STATE OF OHIO
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74490
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Drawing Title
PROCESS CHILLED WATER FLOW DIAGRAM

Approved: Project Director

Project Title
PROVIDE PROCESS LOOP TIE-INS

Location
VAMC - WADE PARK

Date	Checked	Drawn
04-03-15	LDH	LDH

Project Number
541-15-203

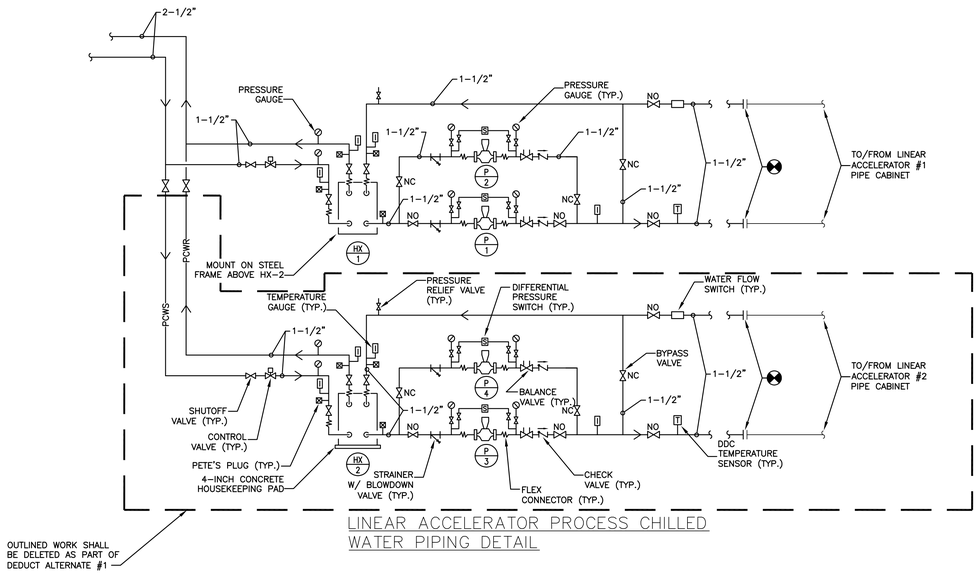
Building Number
1

Drawing Number
1-M3
Dwg. of

Office of Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978



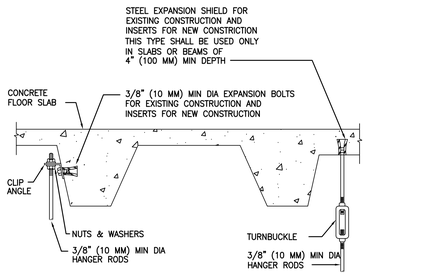
LINEAR ACCELERATOR PROCESS CHILLED WATER PIPING DETAIL

NOTES:

A. RACK PUMPS AND PIPING TO FLOOR-SUPPORTED STEEL SUPPORT STRUCTURE. CONTRACTOR SHALL PROVIDE STRUCTURAL ANGLE IRON AND TUBE STEEL AS REQUIRED.

B. ABSOLUTELY NO PIPING SHALL BE SUPPORTED BY PUMP(S).

C. PROVIDE NEOPRENE PADS BETWEEN UNISTRUT AND EQUIPMENT.



TYPICAL METHOD OF SECURING HANGER RODS IN CONCRETE SLABS AND BEAMS.

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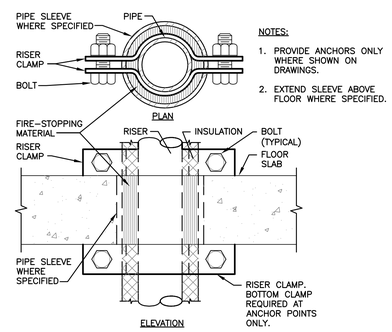
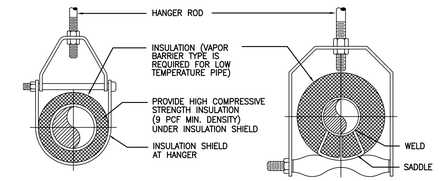


NOTES:

1. PROVIDE ANCHORS ONLY WHERE SHOWN ON DRAWINGS.
2. EXTEND SLEEVE ABOVE FLOOR WHERE SPECIFIED.

SUPPORT/ANCHOR FOR PIPE RISERS DETAIL

NTS



TYPICAL PIPE HANGERS

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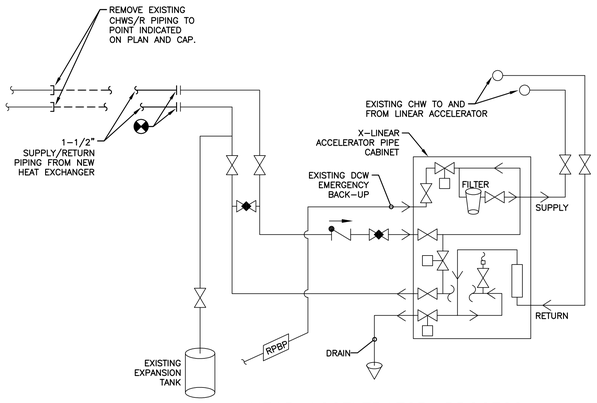
MAXIMUM PIPE/TUBING SUPPORT SPACING											
NOM. SIZE	IN. (MM)	THRU 3/4 THRU (20)	1 (25)	1 1/4 (32)	1 1/2 (40)	2 (50)	2 1/2 (65)	3 (75)	4 (100)	5 (125)	6 (150)	8 (200)
PIPE	FT. (M)	7 (2.1)	7 (2.1)	7 (2.1)	9 (2.7)	10 (3.0)	11 (3.4)	12 (3.7)	14 (4.1)	16 (4.9)	17 (5.2)	19 (5.8)
TUBING	FT. (M)	5 FT	6 (1.8)	7 (2.1)	8 (2.4)	8 (2.4)	9 (2.7)	10 (3.0)	12 (3.7)	13 (4.0)	14 (4.1)	16 (4.9)
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.												



LINEAR ACCELERATOR, PROCESS CHILLED WATER CONNECTION DETAIL

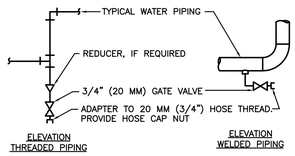
NTS

NOTES:

A. CONTRACTOR SHALL COORDINATE WITH VA COR AND USER GROUP THE SHUTDOWN OF CHILLED WATER TO LINEAR ACCELERATOR VALVE/PIPE CABINET.

B. PRIOR TO SHUTDOWN OF CHILLED WATER SERVICE, LINEAR ACCELERATOR PIPE CABINET SHALL BE SWITCHED TO DOMESTIC WATER BACK-UP.

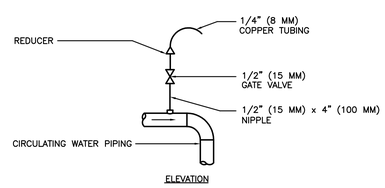
C. UPON COMPLETION OF PROCESS CHILLED WATER CONNECTIONS, FLUSHING, CLEANING, TESTING, ETC. LINEAR ACCELERATOR SHALL BE SWITCHED OVER TO NEW PROCESS CHILLED WATER SERVICE.



TYPICAL CHILLED AND HOT WATER PIPING DRAIN VALVE CONNECTIONS

NOTES:

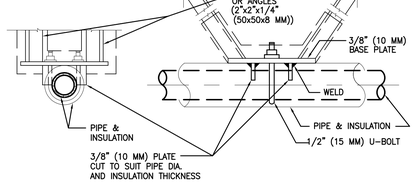
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.
2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.



TYPICAL AIR VENT

NOTES:

1. VENT ALL HIGH POINTS INDICATED ABOVE.
2. IF AUTOMATIC AIR VENTS ARE USED, PIPE DISCHARGE TO DRAIN



HORIZONTAL PIPE ANCHOR DETAIL

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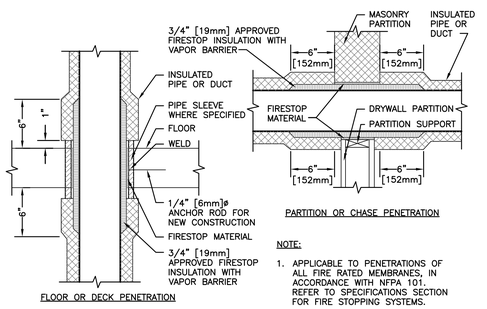

NOTE:

1. APPLICABLE TO PENETRATIONS OF ALL FIRE RATED MEMBRANES, IN ACCORDANCE WITH NFPA 101. REFER TO SPECIFICATIONS SECTION FOR FIRE STOPPING SYSTEMS.

PIPE/DUCT PENETRATION OF FIRE/SMOKE BARRIERS

NTS

FOR CONSTRUCTION

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Final Construction Documents	04-03-15
Revisions:	**Date**

CONSULTANTS:

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Drawing Title: **MECHANICAL DETAILS**

Approved: Project Director

Project Title: **PROVIDE PROCESS LOOP TIE-INS**

Location: **VAMC - WADE PARK**

Date: 04-03-15 | Checked: **LDH** | Drawn: **LDH**

Project Number: 541-15-203

Building Number: 1

Drawing Number: **1-M4**

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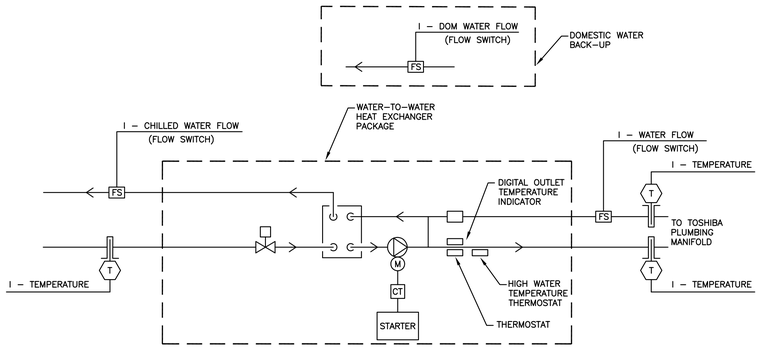
Office of Facilities Management

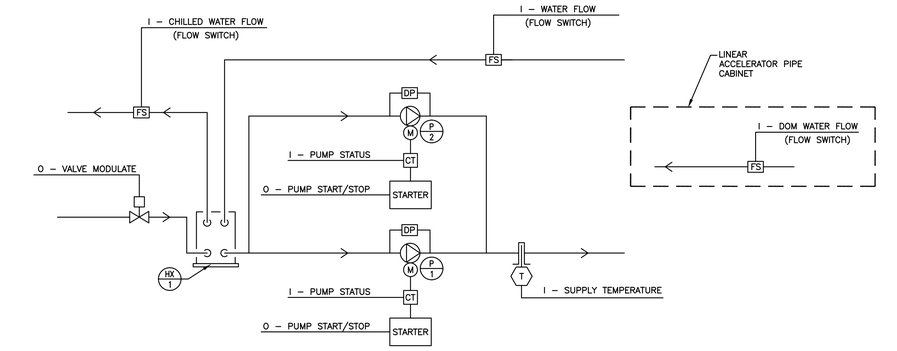
Department of Veterans Affairs

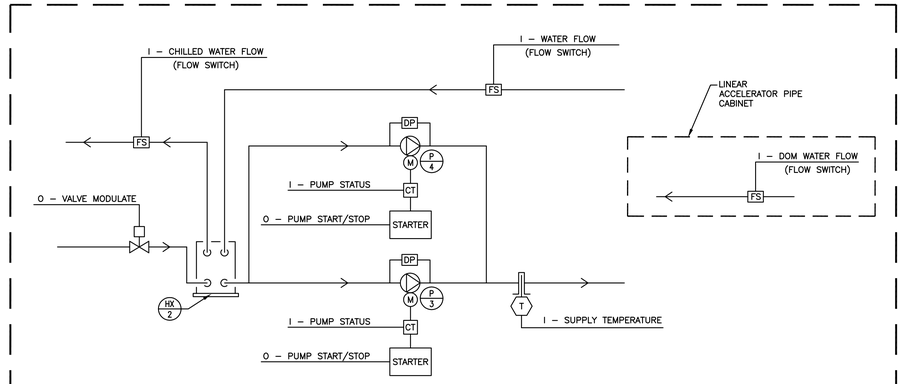
VA FORM 08-6231, OCT 1978



SEQUENCE OF OPERATION FOR TOSHIBA CHILLED WATER SYSTEM

1. OUTLINED SYSTEM ABOVE IS A PACKAGED WATER TO WATER SYSTEM THAT SHALL BE INTEGRATED INTO THE EXISTING PIPING SYSTEM SERVING THE TOSHIBA MRI.
   1.1. IN GENERAL, THE PUMP SHALL RUN CONTINUOUSLY.
   1.2. OUTLINED SYSTEM IS DRAKE HEAT EXCHANGER PACKAGE. REFERENCE FLOOR PLANS FOR ADDITIONAL INFORMATION.
2. THE CONTRACTOR SHALL CONNECT TO 0–20mA THERMOSTAT TERMINAL ON JCI CONTROLLER AND EXTEND TO EXISTING ANDOVER BUILDING AUTOMATION SYSTEM.
3. SYSTEM SHALL BE MONITORED THROUGH THE EXISTING ANDOVER BAS.
4. ALARMS SHALL BE PROVIDED AS FOLLOWS:
   4.1. LOSS OF FLOW FOR CHILLED WATER
   4.2. LOSS OF FLOW FOR MRI WATER LOOP
   4.3. COOLING (EQUIPMENT–SIDE) WATER TEMPERATURE:
   4.3.1. HIGH WATER SUPPLY TEMPERATURE: IF GREATER THAN 70 DEG F (ADJ).
   4.3.2. LOW WATER SUPPLY TEMPERATURE: IF LESS THAN 60 DEG F (ADJ).
   4.4. SYSTEM IN BACK–UP DOMESTIC WATER MODE.
5. ALARMS SHALL BE RELAYED TO EXISTING ANDOVER BUILDING AUTOMATION SYSTEM. WHEN AN ALARM IS GENERATED, LOCAL PERSONNEL SHALL BE NOTIFIED VIA A WALL–MOUNTED REMOTE ALARM INDICATION STATION. STATION SHALL BE LOCATED IN ASSOCIATED CONTROL ROOM OR AS COORDINATED BY VA COR AND RESPECTIVE USER GROUP. SEE REMOTE ALARM INDICATION STATION NOTES, THIS DRAWING.

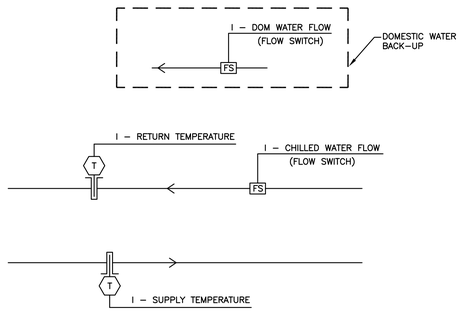




OUTLINED WORK SHALL BE DELETED AS PART OF DEDUCT ALTERNATE #1

SEQUENCE OF OPERATION FOR LINEAR ACCELERATOR CHILLED WATER SYSTEM (TYPICAL OF 2)

1. EACH SYSTEM CONSISTS OF (2) WATER–TO–WATER HEAT EXCHANGERS AND (2) INLINE, CONSTANT VOLUME PUMPS. PUMPS OPERATE IN A LEAD–STANDBY FASHION.
2. IN GENERAL, THE LEAD PUMP SHALL OPERATE CONTINUOUSLY.
3. THE CONTROL VALVE SHALL MODULATE THE PROCESS CHILLED WATER FLOW THROUGH THE HEAT EXCHANGER TO ACHIEVE EQUIPMENT–SIDE WATER TEMPERATURE SETPOINT, 65 DEG F (ADJ).
4. THE SYSTEM SHALL BE CONTROLLED AND MONITORED VIA THE EXISTING ANDOVER BUILDING AUTOMATION SYSTEM.
5. THE DESIGNATED LEAD PUMP SHALL ALTERNATE MONTHLY (OR AS SELECTED BY THE USER/VA).
6. UPON FAILURE OF THE LEAD PUMP, AN ALARM SHALL BE GENERATED AND THE STANDBY PUMP SHALL BE STARTED.
7. ALARMS SHALL BE PROVIDED AS FOLLOWS:
   7.1. LEAD PUMP (P–1 OR P–3)
   7.1.1. FAILURE: COMMANDED ON, BUT STATUS IS OFF.
   7.1.2. RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
   7.1.3. RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS USER DEFINED LIMIT.
   7.2. STAND–BY PUMP (P–2 OR P–4)
   7.2.1. FAILURE: COMMANDED ON, BUT STATUS IS OFF.
   7.2.2. RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
   7.2.3. RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS USER DEFINED LIMIT.
   7.3. FLOW
   7.3.1. LOSS OF FLOW.
   7.4. COOLING (EQUIPMENT–SIDE) WATER TEMPERATURE:
   7.4.1. HIGH WATER SUPPLY TEMPERATURE: IF GREATER THAN 70 DEG F (ADJ).
   7.4.2. LOW WATER SUPPLY TEMPERATURE: IF LESS THAN 60 DEG F (ADJ).
   7.5. SYSTEM IN BACK–UP DOMESTIC WATER MODE.
8. ALARMS SHALL BE RELAYED TO EXISTING ANDOVER BUILDING AUTOMATION SYSTEM. WHEN AN ALARM IS GENERATED, LOCAL PERSONNEL SHALL BE NOTIFIED VIA A WALL–MOUNTED REMOTE ALARM INDICATION STATION. STATION SHALL BE LOCATED IN ASSOCIATED CONTROL ROOM OR AS COORDINATED BY VA COR AND RESPECTIVE USER GROUP. SEE REMOTE ALARM INDICATION STATION NOTES, THIS DRAWING.



TEMPERATURE CONTROLS FOR PHILIPS MRI EQUIPMENT ROOM

1. EXISTING PHILIPS MRI EQUIPMENT SHALL BE RE–PIPED TO PROCESS CHILLED WATER SYSTEM AS PART OF THIS PROJECT.
2. SUPPLY AND RETURN PROCESS CHILLED WATER LINES FEEDING MRI EQUIPMENT PIPE MANIFOLD SHALL BE PROVIDED TEMPERATURE SENSORS (1 SUPPLY / 1 RETURN) AND A FLOW SWITCH.
3. ALARMS SHALL BE PROVIDED AS FOLLOWS:
   3.1. FLOW
   3.1.1. LOSS OF FLOW.
   3.2. PROCESS CHILLED WATER TEMPERATURE:
   3.2.1. HIGH WATER SUPPLY TEMPERATURE: IF GREATER THAN 50 DEG F (ADJ).
   3.2.2. LOW WATER SUPPLY TEMPERATURE: IF LESS THAN 40 DEG F (ADJ).
   3.2.3. HIGH WATER RETURN TEMPERATURE: IF GREATER THAN 65 DEG F (ADJ).
   3.3. SYSTEM IN BACK–UP DOMESTIC WATER MODE.
5. ALARMS SHALL BE RELAYED TO EXISTING ANDOVER BUILDING AUTOMATION SYSTEM. WHEN AN ALARM IS GENERATED, LOCAL PERSONNEL SHALL BE NOTIFIED VIA A WALL–MOUNTED REMOTE ALARM INDICATION STATION. STATION SHALL BE LOCATED IN ASSOCIATED CONTROL ROOM OR AS COORDINATED BY VA COR AND RESPECTIVE USER GROUP. SEE REMOTE ALARM INDICATION STATION NOTES, THIS DRAWING.

REMOTE ALARM INDICATION STATION:

A. ALARM INDICATION STATIONS SHALL BE INSTALLED IN EACH OF THE FOLLOWING AREAS:
   - LINEAR ACCELERATOR CONTROL ROOM C21N
   - LINEAR ACCELERATOR CONTROL ROOM BB210C
   - CONTROL ROOM 1–B–537 (TOSHIBA MRI)
   - CONTROL ROOM 1–B–533 (PHILIPS MRI)

B. REMOTE ALARM INDICATION STATION SHALL BE WALL–MOUNTED, IN SIGHT OF OCCUPANTS. STATION SHALL BE MOUNTED ON A STAINLESS STEEL 2X4 PLATE. THE ALARM SHALL BE 24 VAC @ 100 mA OR 24 VDC @ 35 mA. THE ALARM SHALL FEATURE: RED ALARM LED, ALARM HORN (CONTINUOUS TONE OR PULSED), ALARM HORN SILENCE SWITCH, ADJUSTABLE ALARM DELAY TIME, ADJUSTABLE ALARM REPEAT TIME.

C. CONTRACTOR SHALL MOUNT LAMACOID PLATE ADJACENT TO STATION WITH DESCRIPTION OF ALARM AND PHONE CONTACT TO VA FACILITIES PERSONNEL.

GENERAL CONTROLS NOTES:

A. IN DIAGRAMS, 'I' INDICATES AN INPUT, 'O' INDICATES AN OUTPUT.

B. ACTUAL LOCATIONS OF COMPONENTS MAY VARY FROM CONTROL DIAGRAM. TC SHALL VERIFY LOCATIONS OF ALL COMPONENTS WITH MC.

C. ACTUATING DEVICES TO BE PROVIDED BY TEMPERATURE CONTROLS CONTRACTOR.

D. TEMPERATURE CONTROL TEST SHALL INCLUDE, BUT NOT BE LIMITED TO:
   - VALVE ACTUATION RESPONSE AND VALIDATION OF CORRECT OPERATION
   - VERIFIED ENTIRE CONTROL SEQUENCE OPERATES PER DESIGN
   - ACCOUNT FOR ALL CONTROL POINTS LISTED

E. ALL NEW ANDOVER CONTROLS SHALL BE BACnet PROTOCOL.

F. CONTRACTOR SHALL PROVIDE COMMISSIONING TREND REPORTS IN PRINT AND ELECTRONIC FORMAT FOR 7 DAY PERIOD AT 15 MINUTE INTERVALS FOR ALL INPUT/OUTPUT (I/O) POINTS AND ALARMS.

FOR CONSTRUCTION

FULLY SPRINKLERED

Revisions:	Date
Final Construction Documents	04-03-15

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PROFESSIONAL ENGINEER
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Drawing Title: **TEMPERATURE CONTROLS**

Approved: Project Director

Project Title: **PROVIDE PROCESS LOOP TIE-INS**

Location: **VAMC - WADE PARK**

Date: 04-03-15 | Checked: **LDH** | Drawn: **LDH**

Project Number: 541-15-203

Building Number: 1

Drawing Number: **1-M5**

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